Physical Interaction with Electronic Instruments in Devised Performance

Volume 2

Appendix

Electronic Music Performance

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Circuit diagrams and technical illustrations are available from the author.

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Appendix A - Version 2 of the Electronic Dumbell

Figure 1 - Version 2 of the Electronic Dumbell

The Electronic Dumbell version 2 was a double-ended, movement operated, hand held instrument approximately eighty centimetres in length. Its main body was made from two tasselled lampshades, bought from a charity shop, facing outward from each other with a handle between them. Its electronic components consisted of two speakers, one inside each lampshade, two ‘Do It Yourself’ electronic oscillators, six tilt switches, force sensors in the handle to control pitch and a readymade ‘Lepai 2020a Tri Path amplifier’ appropriated for use with this instrument, which was powered by three nine-volt batteries. The tilt switches operated short circuits that changed the sound of the oscillators. The two force sensors in the handle controlled the pitch of the two oscillators.

Appendix B - Version 3 of the Electronic Dumbell

Figure 2 - Version 3 of the Electronic Dumbell

The Electronic Dumbell version 3 was smaller than version 2. Its electronics were the same as version 2 except the amplifier, which was based on a simple LM384 integrated circuit that was powered by two nine-volt batteries. The handle was machined so the speaker magnets would fit into holes at each end.

Appendix C - The Beast

Figure 3 - The Beast

The Beast was a dragged instrument inspired by Gordon Monohan's *Speaker Swinging* (Monohan, 1982). It was an array of small, appropriated speaker cones mounted in a concave disc roughly sixty centimetres in diameter and designed to be dragged across the ground using an old rusty chain. The speaker magnets were shielded from damage by two protection systems, one being four metal feet attached to the speaker magnets for use on smooth surfaces in *New Track Of Unknown Terra I* and the other being a perspex sled for rough surfaces which was used in *New Track Of Unknown Terra II*. It had nine piezo microphones on its underside so that it could amplify the sound of itself being dragged using three LM384 based amplifiers. It was also prone to acoustic feedback. There was a second version of The Beast consisting of one large eighteen-inch speaker cone dragged by a chain, which was used in *Uncertain Construction*.

Appendix D - The Pensile Decumbent

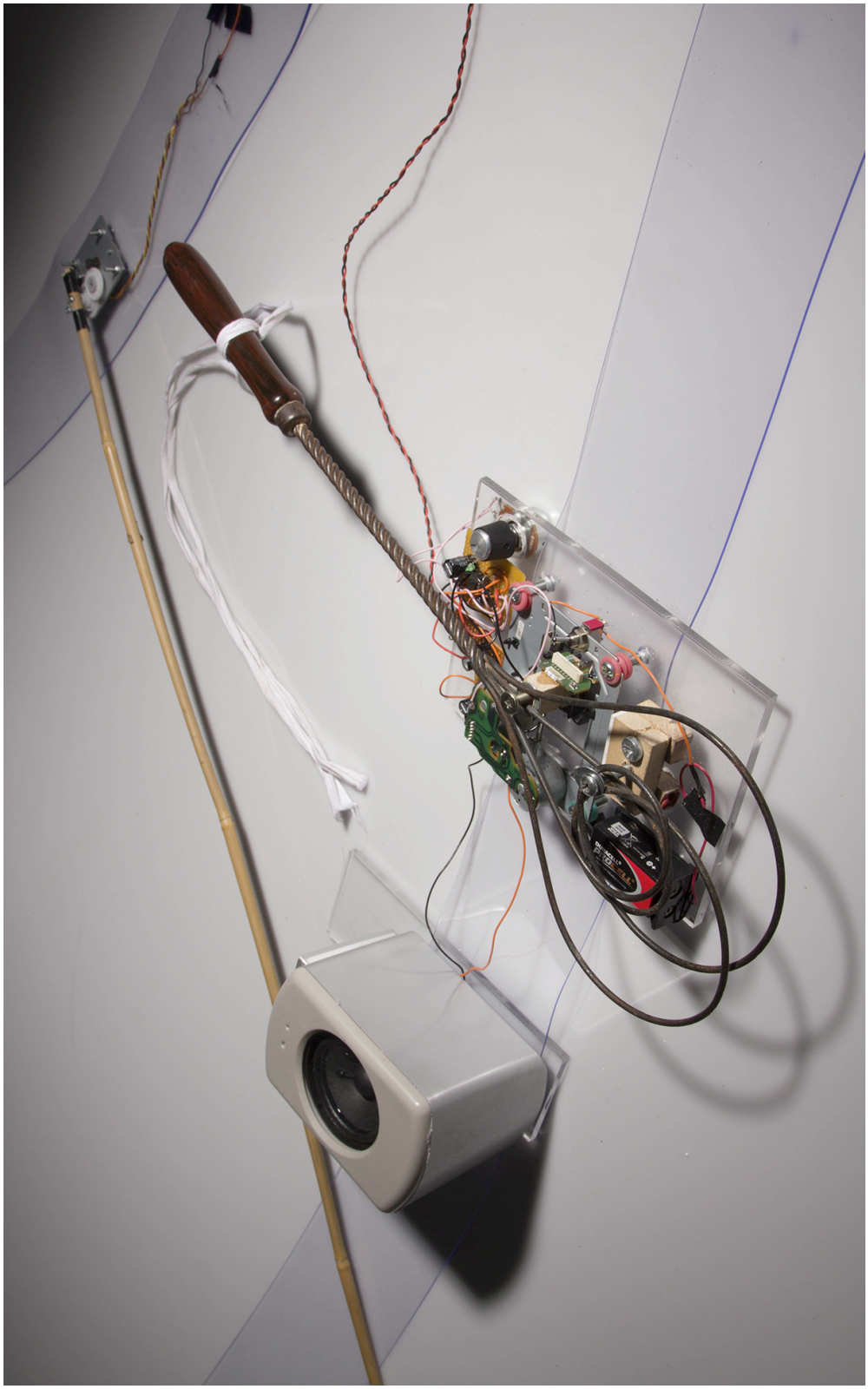

Figure 4 - The Pensile Decumbent

The Pensile Decumbent was a wearable kinetic instrument that came in two parts. One part was worn on the upper torso and had a pendulum, made from bamboo and Victorian copper pipe, attached to a scanner motor that sat in the middle of the wearer's back. Rocking from side to side made the pendulum swing and thus generate a small current. The other part was worn around the performer's waist and had a cantilever and motor mechanism on the right hand side attached to the wearer's leg. When the wearer moved a leg or thrust a hip then a small current was generated from the motor. The cantilever mechanism was made from a nineteen thirties carpet beater and the laser head carriage of a compact disc player. The pendulum powered the oscillators and the cantilever modulated their sound, which came from a speaker placed on the performer's crotch and powered by an LM384 amplifier circuit.

Appendix E – The Pallet

The Pallet instrument was a UK cargo pallet with two gear chain motors from two Hewlett Packard laser printers; one attached each side like wheels, which turned and generated current as the pallet was dragged along the ground. They were attached via long audio cables to a public address system to transform their current into sound. The motors were removed for the *Pensile Decumbent* performance in the cooling tower.

Appendix F - The Plungerphone

Figure 5 - The Plungerphone

The Plungerphone was a hand held electronic instrument that used a simple oscillator based on the NJM2073D and speaker placed inside a domestic plunger. Some of the sound manipulations were gesture based using two tilt switches on the circuit board to create two short circuits and others were touch based using foil strips on the handle to control the pitch and a filter when the performer completed a circuit by touching more than one foil strip at once. There was no amplifier, a nine-volt battery powered the oscillator and the instrument had an audio jack output, which disconnected the internal speaker when a plug was inserted and allowed it to be connected to a public address system.

Appendix G - The Speaker Bra

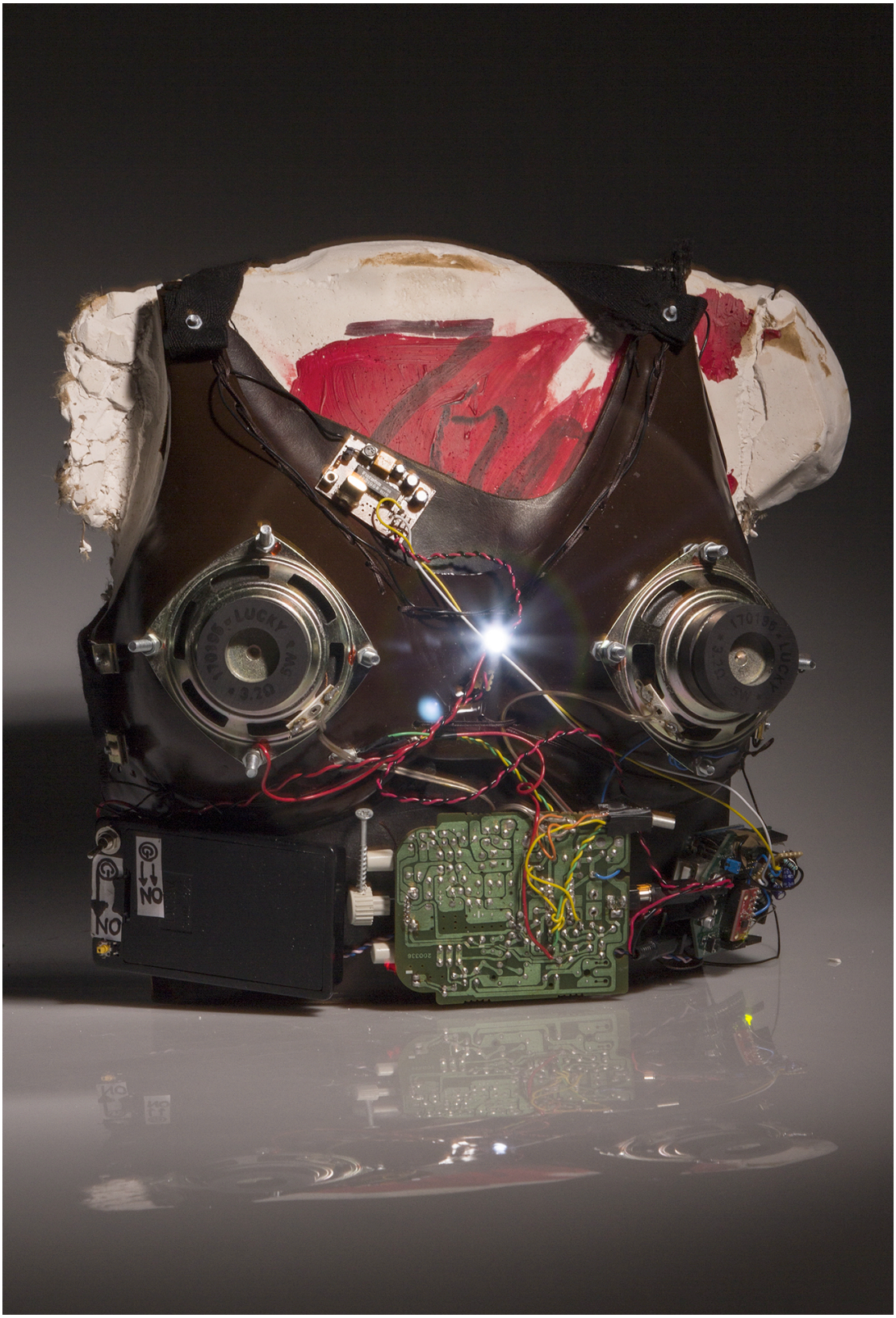

Figure 6 - Speaker Bra

The Speaker Bra was the second part of the Speaker Bra and Shovel instrument. It was a wearable vacuum-formed chest shield of female form with found speaker cones mounted over the nipples. The electronic components were mounted on the plastic and adjunct sections of leather. They consisted of a found amplifier circuit, a radio receiver and an Arduino Uno with a *Ronin Synth* shield (Frize, 2013). It was inspired by Nam June Paik's *Television Bra* (Hanhardt, 2000) and the *Maschinenmensch* from Fritz Lang's film *Metropolis* (Schulze-Mittendorff, 1927). There were two tilt switches on the Speaker Bra that created short circuits in the amplifier for further sound manipulation using movement. There was a three axis accelerometer on the Ronin Synth that was assigned to modulation depth parameters and a short circuit wire was connected to each speaker chassis, so that when the performer touched both speakers at the same time they completed the short circuit that produced tweets and beeps.

Appendix H - The Wireless Shovel

Figure 7 - Wireless Shovel

The Shovel was a found object that was a part of the Speaker Bra and Shovel instrument. It had a three-axis accelerometer and radio transmitter attached to the blade. It transmitted its orientation from two axes to a receiver on the Speaker Bra, which sent orientation change information to the oscillators on board the *Ronin Synth* Arduino Shield (Frize, 2013).